



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/677,198	10/02/2000	Michael J. Natan	PSU 60 2182B	7112

25871 7590 01/03/2003  
SWANSON & BRATSCHEUN L.L.C.  
1745 SHEA CENTER DRIVE  
SUITE 330  
HIGHLANDS RANCH, CO 80129

EXAMINER

MARSCHER, ARDIN H

ART UNIT	PAPER NUMBER
----------	--------------

1631

DATE MAILED: 01/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/677,198

Applicant(s)  
Natan et al.

Examiner  
Ardin Marschel

Art Unit  
1631



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Sep 4, 2002
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-86 is/are pending in the application.
- 4a) Of the above, claim(s) 1-36, 48-54, and 65-86 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37-47 and 55-64 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claims 1-86 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s).
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) 11 sheets 6) Other:

Applicants' election of Group II, Specie B (particles with segments plus functionalization), (claims 37-47 and 55-64) in Paper No. 13, filed 9/4/02, is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (M.P.E.P. § 818.03(a)).

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The present title is directed to particles whereas, in contrast, the elected subject matter is directed to differentiable assemblies of functionalized, segmented, particles.

Claims 37-47 and 55-64 are rejected, as discussed below, under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 37 and 55 the types of particles are described as being "differentiable". It may be speculated that this differentiable character is interpreted as being directed to characterization which differentiates between types of particles. However, this is not clearly set forth in the claims as worded. Alternatively, the particles may be differentiable from their environment, or detectably differentiable. Clarification via clearer claim wording is requested as to what metes and bounds

are meant for the differentiable practice in the claims. Claims dependent directly or indirectly from claims 37 and 55 also contain this unclarity due to their dependence.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 37-39, 42, 43, 45-47, 55-61, 63, and 64 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Liu et al. [Ref. AY: Physical Review B, 51(11):7381-7384(1995)].

The title of Liu et al. indicates that the subject matter of the reference is directed to the characterization of nanowires. The abstract goes on to state that these nanowires are electrodeposited with different diameters and various layer thicknesses. On page 7381, bridging paragraph between the first and second columns, the reference summarizes the preparation of the nanowires of various sizes, defined by membrane pores of 30 nm or 400 nm and pore (membrane thickness) length of 6  $\mu\text{m}$  or 10  $\mu\text{m}$ , wherein a copper (Cu) layer is firstly deposited on one side

of a porous membrane followed by deposition of alternating Co and Cu layers in the pores of the membrane. Segment lengths are varied from a few to several hundred angstroms as noted in Liu et al. on page 7382, first column, first 5 lines. On page 7382, Figure 2, a membrane is depicted with nanowires shown in part (b) after removal of the membrane, part (a), that was used for preparation of the nanowires. The Figure 2 shown nanowires in part (b) are nonuniform in structure and thus differentiable as required in instant claim 55. This differentiable characteristic also supports the practice of the claim limitation directed to the assembly of particles in instant claim 55 as being a plurality of types. The particles are 30 nm diameter particles as disclosed in said Figure 2 which anticipates the requirement in instant claim 55 that at least one dimension is less than 10  $\mu\text{m}$ . It is noted that instant claim 55 lacks any limitation regarding whether or not that the particles of the assembly may be connected, for example, via the above described copper layer on which they are made. Applicants are reminded that the above preparatory discussion included the presence of a copper layer on one side of the membrane onto which the nanowire layering was then deposited. The nanowires of the assembly of the reference are functionalized in that a functional membrane is attached to them during their preparation. It is noted that the instant specification on page 8, lines 12-29, describes functionalization

of the instantly claimed nanoparticles as inclusive of a wide variety of practices. One of these is functionalization with a polymer. It is noted that polycarbonate membranes are utilized as the membranes in the reference which thus qualifies as a functionalization, with the particles being segmented via Cu/Co layering of the nanowires of Liu et al., which is the elected specie of the instant claims. Note the specie election summarized above for this application. The polycarbonate membrane is also detectable, organic, and molecular in nature and thus detectably tags the nanowires as required in instant claims 46 and 47 and is organic type substance in being a carbonate as required in instant claim 45. The above disclosures also document anticipation of instant claim 37 in that the assembly of particle nanowires of the reference are composed of a plurality of differentiable types with sizes in the range of the 10 nm to 50  $\mu$ m in length as supported in Figure 2 of the reference wherein the legend discloses 400 nm (0.4  $\mu$ m) length pores with the nanowires therein. Therefore the above listed instant claims are anticipated by Liu et al.

Claims 37-39, 42, 43, 45-47, 55-61, 63, and 64 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Wang et al. [Ref. BS: Thin Solid Films, 288:86-89(1996)].

Similar to the above reference, Wang et al. deposits layered Ni/Cu layered TEM differentiable nanowires (60-80 nm diameter

and about 5  $\mu\text{m}$  length) into pores of a membrane with a Gold film backing. These functionalized and segmented nanowires also anticipate the above instant claims equivalent to the above Liu et al. reference.

Claims 37-47 and 55-64 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Kaye et al. [Ref. AS: WO 97/15390(1997)].

Kaye et al. discloses the preparation of usage of combinatorial libraries wherein coded support particles are utilized for coding the library components as summarized in the section entitled "Field of the Invention" on page 1. The separately coded beads are each functionalized with a compound as disclosed on pages 5-7 of the reference. The solid supports or beads are in the range of 1 - 500 microns as noted on page 9, lines 21-26. Layering or segmentation of the particles is described in the bridging paragraph between pages 11 and 12 as well as between pages 15 and 16. Layer thicknesses are 10 to 30 microns as disclosed on page 13, lines 14-17. These coded particles form a library of a plurality of members, such as described on page 18, lines 13-25. Optical detection of the coded particle assembly is disclosed on page 19, line 24, through page 22, line 2, with illumination such as described on page 21, lines 1-2, thus documenting differential reflectivity in order to read a code thereby as also required for instant claim 41. These

disclosures anticipate the above listed instant claims.

Claims 55-64 are rejected under 35 U.S.C. § 102(a) as being clearly anticipated by Sorge[Ref. AO: WO 99/18240(1999)].

Sorge discloses the preparation and usage of combinatorial libraries wherein the components therein are differentially tagged with nucleic acid, such as 20 base oligonucleotides (page 10, first full paragraph) as summarized on pages 1-12. A 20 nucleotide tag has a length of 68 Angstroms (6.8 nm which is less than 10  $\mu$ m) if coiled in a duplex and longer if single stranded. See Lehninger at page 640 utilized here only to document these dimensions based on 3.4 Angstroms per basepair in coiled DNA. It is noted that instant claim 55 lacks any lower length limitation. These disclosures anticipate the above listed instant claims.

Three citations to applications for U.S. Patents are lined through on the enclosed PTO 1449 forms due to a lack of dates of publication as required for citations on such a form. These applications, however, have been considered.

No claim is allowed.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR § 1.6(d)). The CM1 Fax Center number is either (703)308-4242 or (703)305-3014.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ardin Marschel, Ph.D., whose telephone number is (703)308-3894. The examiner can normally be reached on Monday-Friday from 8 A.M. to 4 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Woodward, Ph.D., can be reached on (703)308-4028.

Any inquiry of a general nature or relating to the status of this application should be directed to Legal Instrument Examiner, Tina Plunkett, whose telephone number is (703)305-3524 or to the Technical Center receptionist whose telephone number is (703) 308-0196.

January 3, 2003

*Ardin U. Marschel*  
Ardin U. Marschel  
Ph.D.  
Legal Instrument Examiner